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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/622,933	07/18/2003	Chee Hong Liau	M&N-IT-465	3481

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EXAMINER
ALHIJA, SAIF A

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2128	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

		Application No.	Applicant(s)
		10/622,933	LIAU, CHEE HONG
Office Action Summary		Examiner	Art Unit	
		Saif A. Alhija	2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>10 July 2007</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>2-7,23-34,37 and 38</u> is/are pending in the application.

   4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>2-7, 23-34, and 37-38</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>18 July 2003</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

   Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   a)☒ All b)☐ Some * c)☐ None of:

      1.☒ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

   * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
     Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
     Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

1.   Claims 2-7, 23-34, and 37-38 have been presented for examination.

Claims 1, 8-22, and 35-36 have been cancelled.

Response to Arguments

2.   A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10 July 2007 has been entered.

      i)   Following Applicants amendment the 101 rejections of the claims are withdrawn.

      ii)   Following Applicants amendment a new 103 rejection has been provided below.

      iii)   Examiner has cited particular columns and line numbers in the references applied to the claims for the convenience of the applicant. Although the specified citations are representative of the teachings of the art and are applied to specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the applicant in preparing responses, to fully consider the references in their entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the Examiner.

      iv)   The Examiner respectfully requests, in the event the Applicants choose to amend or add new claims, that such claims and their limitations be directly mapped to the specification, which provides support for the subject matter. This will assist in expediting compact prosecution.

      v)   Further, the Examiner respectfully encourages Applicants to direct the specificity of their response with regards to this office action to the broadest reasonable interpretation of the claims as presented. This will avoid issues that would delay prosecution such as limitations not explicitly presented in the claims, intended use statements that carry no patentable weight, mere allegations of patentability, and novelty that is not clearly expressed.

PRIORITY

3.   Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4.   Claim(s) 2-7, 23-34, and 37-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Yao "Evolving Artificial Neural Networks", hereafter referred to as Yao in view of West, "Next Generation Test Generator (NGTG) Interface to Automatic Test Equipment (ATE) for Digital Circuits", hereafter referred to as West.**

Regarding Claim 37:

Yao discloses A method of testing an integrated circuit, the method which comprises:

adapting a neural network to approximate a behavior of the integrated circuit, by:

(a) applying a set of test patterns to the integrated circuit; **(Abstract. Page 1438, Section D, Circuit Parameters)**

(b) applying the set of test patterns to the neural network; **(Abstract. ANN)**

(c) comparing outputs of the integrated circuit and outputs of the neural network to form a comparison result; **(Page 1424, Section 2, Direct Comparison)** and

(d) adapting parameters of the neural network to approximate the behavior of the integrated circuit on a basis of the comparison result; **(Abstract. Learning/Evolution)**

subsequently applying further test patterns to the neural network thus adapted; **(Fig. 11. Partial Training, Further Training)**

processing an output of the neural network to determine whether predetermined criteria are met; **(Page 1424, Section 2, Direct Comparison)**

selecting those further test patterns that meet the predetermined criteria; **(Page 1424, Section 2, Direct Comparison)**

(A) providing a set of test patterns consisting of the selected test patterns; **(Page 1427, Left Column, Evolving Connection implementation)**

(B) applying the set of selected test patterns to the <u>integrated circuit using automatic test equipment</u> <u>(ATE) as a measurement system for semiconductors (See 103 rejection below)</u>; **(Page 1427, Left Column, Evolving Connection implementation)**

(C) determining the outputs of the integrated circuit; **(Page 1424, Section 2, Direct Comparison)**

(D) processing the outputs to determine whether predetermined test criteria are met; **(Page 1424, Section 2, Direct Comparison)** and

(E) depending on a determination in step (D), generating a new set of test patterns based on the set of selected test patterns provided in step (A) using a genetic algorithm; **(Page 1424, Section B, GA's)**

and testing the integrated circuit with the new set of test patterns and outputting a result of the testing step. **(Abstract. Page 1438, Section D, Circuit Parameters)**

Yao does not explicitly disclose (B) applying the set of selected test patterns to the integrated circuit using automatic test equipment (ATE) as a measurement system for semiconductors.

However, West discloses applying the set of selected test patterns to the integrated circuit using automatic test equipment (ATE) as a measurement system for semiconductors (Abstract, NGTG interfaced

with an ATE where the NGTG comprises genetic algorithms and a neural network and an interface to an

ATE, also DTU in Abstract)

Yao and West are analogous art in that they both deal with neural network evolution and genetic

algorithms.

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the

format of Yao with the incorporation of an ATE as disclosed in West in order to overcome the expense and time

consumption of alternate test generation. (See West, Abstract, paragraph 1)

Regarding Claim 2:

Yao discloses The method according to claim 37, which comprises:

using, as the system for testing the integrated circuit, an automatic test equipment (ATE); (Page 1427, Left

Column, Evolving Connection implementation)and

applying the set of test patterns to the integrated circuit via the automatic test equipment. (Page 1427, Left

Column, Evolving Connection implementation)

Regarding Claim 3:

Yao discloses The method according to claim 2, which comprises implementing the neural network in the

automatic test equipment. (Page 1427, Left Column, Evolving Connection implementation)

Regarding Claim 4:

Yao discloses The method according to claim 37, which comprises generating the set of test patterns on a

random basis. (Page 1427, Left Column, Random)

Regarding Claim 5:

Yao discloses The method according to claim 37, wherein step (d) includes adapting inter-unit weights of

the neural network through back-propagation. (Page 1424, Section 2, BP)

Regarding Claim 6:

Yao discloses The method according to claim 37, which comprises repeating steps (a) to (d) until a level of adaptation in step (d) falls below a given value. **(Page 1423, Section A, Threshold)**

Regarding Claim 7:

Yao discloses The method according to claim 5, which comprises storing data representing predetermined neural network parameters after terminating a repetition of steps (a) to (d). **(Fig. 11. Partial Training, Further Training)**

Regarding Claim 23:

Yao discloses The method according to claim 37, which comprising repeating steps (B) to (E) until the given test criteria are met. **(Fig. 11. Partial Training, Further Training)**

Regarding Claim 24:

· Yao discloses The method according to claim 37, which comprises repeating steps (B) to (E) until a condition is met, the condition being selected from the group consisting of meeting the given test criteria and repeating steps (B) to (E) a given number of times. **(Fig. 11. Partial Training, Further Training)**

Regarding Claim 25:

Yao discloses The method according to claim 37, which comprises concluding that the given test criteria are met if the set of test patterns is associated with an average fitness above a given value. **(Page 1430, Left Column, Paragraph 2. Fitness)**

Regarding Claim 26:

Yao discloses The method according to claim 37, wherein step (E) includes combining at least some of the test patterns according to the genetic algorithm in order to provide the new set of test patterns. **(Page 1424, Section**

B, GA's)

Regarding Claim 27:

Yao discloses The method according to claim 26, which further comprises: selecting test patterns from the set of test patterns according to given selection criteria in order to provide selected test patterns; and combining the selected test patterns according to the genetic algorithm to provide the new set of test patterns. **(Page 1424, Section B, GA's)**

Regarding Claim 28:

Yao discloses The method according to claim 27, which comprises selecting a test pattern if the test pattern is associated with a fitness value greater than a reference value. **(Page 1437, Fitness Estimator)**

Regarding Claim 29:

Yao discloses The method according to claim 27, which comprises selecting a test pattern if the test pattern is associated with a highest fitness value of all unselected test patterns. **(Page 1437, Fitness Estimator)**

Regarding Claim 30:

Yao discloses The method according to claim 27, which comprises selecting a test pattern if the test pattern is associated with a highest fitness value of all unselected test patterns, and repeating the selecting step until a given percentage of test patterns has been selected. **(Page 1437, Fitness Estimator)**

Regarding Claim 31:

Yao discloses The method according to claim 29, wherein step (E) includes: (F) sorting selected test patterns according to an order of associated fitness values; (G) randomly selecting parent test patterns from test patterns as sorted in step (F); and (H) combining selected ones of the parent test patterns. **(Page 1437, Fitness Estimator)**

Regarding Claim 32:

Yao discloses The method according to claim 37, which comprises using at least one element selected from the group consisting a mutation, a crossing over, and a re-combination for the genetic algorithm. **(Page 1424, Section B, GA's)**

Regarding Claim 33:

Yao discloses The method according to claim 37, wherein the step (A) includes providing a plurality of sets of test patterns such that each of the sets of test patterns is included in a test pattern population. **(Page 1424, Section B, Population-Based)**

Regarding Claim 34:

Yao discloses The method according to claim 37, which comprises providing a plurality of test pattern populations and performing steps (B) to (E) for each of the test pattern populations. **(Page 1424, Section B, Population-Based)**

Regarding Claim 38:

See rejection for claim 37.

Conclusion

5.   All Claims are rejected.

6.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Saif A. Alhija whose telephone number is (571) 272-8635. The examiner can normally be reached on M-F, 11:00-7:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini Shah can be reached on (571) 272-22792279. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SAA

September 26, 2007

KAMINI SHAH
SUPERVISORY PATENT EXAMINER